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Substitute Specification:

-- METHOD AND SYSTEM FOR OPERATING A MOBILE TELECOMMUNICATION TERMINAL IN A CELLULAR MOBILE RADIO NETWORK

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention generally pertains to mobile telecommunications terminals. In particular, the present invention pertains to mobile telecommunications terminals in public cellular mobile radio networks.

Discussion of the Related Art

Using wireless communication terminals, such as mobile radio transmission/reception devices, as telecommunications terminals is known. Some types of common wireless communications terminals include, wireless telephones, mobile telephones, satellite radio telephones, and trunk radio telephones.

Furthermore, it is known to operate such telecommunication devices or terminals within international mobile radio networks according to various standards, such as the GSM standard (Global System for Mobile) communication, for example.

Telephone users have communication possibilities in such mobile radio networks and data services, and further services can be performed via the network. Known public mobile radio networks can be connected together with further networks such as the public telephone network or an ISDN network, as well as with local, line-bound networks. Moreover, connections from and to other public mobile radio networks are supported as well.

The GSM mobile radio network is a mobile communication system, which is cellularly composed of a great number of radio units, wherein each radio cell is operated by a base transmitting-receiving station, which set up connections to the mobile stations of the subscribers via corresponding air interfaces.

The base transmitting-receiving stations are normally operated by a what is referred to as base drive. A plurality of base drives are connected to a mobile switching center, which assumes the required switching-oriented functions in a fixed coverage area in the radio network.

The increase in the use of wireless telecommunication offered by mobile stations leads to dangers at locations where low transmission performances in critical frequency areas can cause interferences with sensitive electronic devices. For example, when a mobile station is used without authority, such as on an airliner. The same dangers are present when mobile telephones or mobile telecommunication terminals are used, for example, in hospitals or close to explosion-endangered spaces, such as gas stations. The intended or unintended use of mobile telephones in public areas such as restaurants, movie theaters, and such, is also disturbing.

Therefore, the present invention provides a method and system for operating mobile telecommunication terminals in a public, cellular mobile radio network involving the use of at least one base transmitting-receiving station and at least one mobile station. The present invention assures that mobile telephones or mobile telecommunication terminals are switched off or deactivated in particular areas when there is concern for electromagnetic compatibility, or in areas where there is the the possibility of high-frequency interference.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a method and system for operating mobile telecommunications terminals in a public cellular mobile radio network.

It is another object of the invention to provide method and system for operating mobile telecommunications terminals involving a pico-cell.

It is a further object of the invention to provide a method and system for deactivating mobile telecommunications terminals in areas where there is concern for electromagnetic compatibility.

BRIEF DESCRIPTION OF THE DRAWING

Figure 1 shows a pico-cell arranged in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The basic method according to the present invention causes a mobile telephone to log off from an adjacent base transmitting-receiving station and go into an inactive state when the mobile telephone receives a specified first message from a locally emitting transmitter of a small capacity, such as a pico-cell transmitter.

The mobile telephone can be automatically reactivated and can log into the network when receiving a second message from the locally emitting transmitter. The network login and logoff is conducted in the framework of a standard protocol exchange with the adjacent base transmitting-receiving station.

It is also possible with respect to the method to manually activate the mobile station and to log into the network when a second message is not present when the

transmission area of the locally emitting transmitter is left. A transition into the active modus or into the standby modus can also be automatically provided when the specified message is not received or is no longer received over a prescribable time interval.

Reception of the specified messages can be optically and/or acoustically signalized to the user of the mobile telephone, wherein it is also conceivable to display the message content or the message parameters at the mobile telephone display.

Optical and/or acoustic signalization calls the attention of the mobile radio telephone user to the fact that he has entered an endangered area, and to the effect that his mobile telephone will soon pass over into the inactive state. As long as the mobile radio telephone user is situated with his mobile telephone in the transmission range of the transmitter of a small capacity and a disabling code is sent and received he is not capable of deliberately operating the telephone again, with the consequence of interfering high-frequency radiation.

In less critical areas, the mobile station need not be completely deactivated but can be kept in an idle mode, wherein, after the transmission range has been left, an automatic transition into the standby modus occurs upon use of conventional processes without user of the mobile station having to input data or commands.

The method of the present invention can be carried out via a device for operating mobile telecommunication terminals in a public, cellular mobile radio network with at least one base transmitting-receiving station and one mobile station. In particular, the mobile station can be a mobile telephone with a transmitter-receiver assembly, a micro controller, a current supply unit and input assemblies and output

assemblies proceeds from a so developed transmitter-receiver assembly, which comprises a pico-cell radio device for receiving and evaluating specified messages. The pico-cell radio device sends the received specified messages onto the micro controller in order to cause it to transmit a network logoff signal via the transmitter-receiver assembly and to deactivate or, switch off the current supply unit of the mobile telephone, while the pico-cell radio device remains active.

In addition to the actual transmitter-receiver assembly, i.e., the operating radio system for the mobile communication, each mobile telecommunication terminal contains a second low-power radio system, particularly a receiving system for the communication over a small distance, which is referred to as pico-cell.

A counter-station, that is a pico-cell transmitter fixed station, is situated at airplane doorways, at entrances to hospitals etc., and sends the specified messages.

As soon as the pico-cell radio device of the mobile station comes close to a pico-cell transmitter fixed station, such that an error-free data exchange becomes possible, the fixed station informs the mobile telecommunication terminal via the pico-cell by means of a separate code that the mobile telephone must be deactivated.

Subsequently, the mobile telephone switches off the cellular radio system, although the pico-cell radio device remains active. In this way, the pico-cell radio device is capable of receiving a further message or code sent by the fixed station.

A DECT (Digital European Cordless Telecommunications) system or Blue-Tooth system (standardized data synchronization), which is already integrated into the mobile telephone or which may be incorporated later, can be used for a pico-cell

radio system. For example, a DECT radio part can be used for what are referred to as dual mode mobile telephones DECT-GSM. Therefore, the pico-cell radio system is not only used for forwarding user data, but also be used for remotely controlling mobile radio device functions independently of actions of the user or, has such a function in addition.

Due to the signaling of the network login in connection with a call by the pico-cell transmitter fixed station, the callers can be informed that a connection cannot be set up at the moment due to a specific location where the mobile radio network user is. It is possible to switch to a call forwarding or a call memory. IMSI (International Mobile Subscriber Identity) detach information is normally transmitted to the network or base transmitting-receiving station prior to the deactivation the respective mobile station in the framework of a GSM mobile radio network.

An exemplary embodiment of the present invention will now be discussed with reference to Figure 1.

Figure 1 shows a basic arrangement of a pico-cell fixed station in the area of the door opening of an airplane.

A pico-cell transmitter fixed station PS, which is capable of transmitting specified messages of small capacity is shown in Figure 1. The fixed station PS is a locally emitting transmitter of small capacity. The fixed station PS is situated on the airplane body F in immediate proximity to the door opening.

If a mobile telephone MT reaches the radiation range of the fixed station PS, such as when a user enters the airplane via the door opening FT, the pico-cell radio device FS in the mobile telephone MT receives a corresponding message.

After this message has been received, the mobile telephone MT logs off from a base transmitting-receiving station (not shown) and the mobile station is completely deactivated subsequent to the network logoff.

Instead of a complete deactivation of the mobile part, the present invention makes it no longer possible to access the respective radio cell via a corresponding transmitter-receiver assembly in the mobile telephone MT. However, the pico-cell radio device FS in the mobile telephone MT remains receive ready.

In the embodiment shown in Figure 1, the mobile telephone is activated again and logged into the network when a second message is transmitted by the locally emitting transmitter, i.e., the pico-cell transmitter fixed station PS. The messages to be transmitted are symbolized by the reference letter C, wherein the transmission path is represented by arrows.

It is certainly possible to manually reactivate the mobile telephone MT and to log into the network after the transmission range of the locally emitting transmitter or of the pico-cell transmitter fixed station PS has been exceeded.

The entering into the transmission range of the fixed station FS is preferably optically and/or acoustically indicated to the user of the mobile telephone MT.

As a result of the described exemplary embodiment shown in Figure 1, it is possible to assure that mobile telephones cannot be intentionally or unintentionally used in particularly security-relevant or endangered areas. In this way, interferences of sensitive electronic devices, for example on airplanes, can be avoided. Call blocking, which can be automatically cancelled when the area is left, can also be externally imposed or enforced onto the mobile telephone in particularly relevant areas, and also at locations where interferences are undesired.

Optical and/or acoustic signaling measures can be used to indicate that the user is entering or leaving a pico-cell area, with the corresponding consequences with respect to the subscriber and user of the mobile radio network.

Although modifications and changes may be suggested by those skilled in the art to which the present invention pertains, it is the intention of the inventors to embody with the patent warranted hereon all changes and modifications that may reasonably and properly come under the scope of their contribution to the art.

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